

Summer Assignment

The following work is due the first day of school WITHOUT EXCEPTION.

1. Read Chapters 1, 24, 25, 26, and 27
 - Be sure to also examine the various pictures, tables, diagrams, etc.
2. Make vocab cards for each of the words listed under the “**Define**” section of this handout by writing the term on one side of an index card and its definition on the other
3. Answer the questions on the following handouts for each chapter using detail

Define the following bolded words from each chapter: (149 total)

Chapter 1 (9 words)

- Eukaryotic cell
- Prokaryotic cell
- DNA
- Genes
- Gene expression
- Genome
- Genomics
- Bioinformatics
- Natural selection

Chapter 24 (34 words)

- Peptidoglycan
- Gram-positive
- Gram-negative
- Capsule
- Endospores
- Fimbriae
- Pili
- Taxis
- Nucleoid
- Plasmids
- Anaerobic respiration
- Nitrogen fixation
- Heterocysts
- Biofilms
- Transformation
- Transduction
- Conjugation
- F factor
- R plasmid
- Extremophiles
- Extreme halophiles
- Extreme thermophiles
- Methanogens
- Decomposers
- Symbiosis
- Host
- Symbiont
- Mutualism
- Commensalism
- Parasitism
- Pathogens
- Exotoxins
- Endotoxins
- Bioremediation

Chapter 25 (19 words)

- Protists
- Endosymbiosis
- Endosymbiont theory
- Serial endosymbiosis
- Secondary endosymbiosis
- Diatoms
- Brown algae
- Holdfast
- Stipe
- Blades
- Dinoflagellates
- Mixotrophs
- Ciliates
- Amoebas
- Pseudopodia
- Foraminiferans
- Red algae
- Green algae
- Producers

Chapter 26 (47 words)

- Sporopollenin
- Alternation of generations
- Gametophyte
- Sporophyte
- Spores
- Embryophytes
- Sporangia
- Apical meristems
- Cuticle (1-plant)
- Stomata
- Chitin
- Yeasts
- Hyphae
- Mycelium
- Haustoria
- Mycorrhizae
- Plasmogamy
- Karyogamy
- Vascular tissue
- Vascular plants
- Bryophytes
- Rhizoids
- Seedless vascular plants
- Xylem
- Tracheids
- Lignin
- Phloem
- Roots
- Leaves
- Microphylls
- Megaphylls
- Seed
- Gymnosperms
- Angiosperms
- Integument
- Ovule
- Pollen grain
- Pollination
- Flower
- Sepals
- Petals
- Stamen
- Carpel
- Ovary
- Fruit
- Lichen
- Endophytes

Chapter 27 (40 words)

- Ediacaran biota
- Filter feeders
- Tissues
- Choanocytes
- Amoebocytes
- Gastrovascular cavity
- Cambrian explosion
- Radial symmetry
- Bilateral symmetry
- Dorsal
- Ventral
- Anterior
- Posterior
- Ectoderm
- Endoderm
- Mesoderm
- Body cavity (coelom)
- Invertebrates
- Vertebrates
- Notochord
- Pharyngeal slits
- Gnathostomes
- Chondrichthyans
- Osteichthyans
- Ray-finned fish
- Lobe-fin
- Tetrapod
- Cuticle (2-arthropods)
- Amphibians
- Amino acids
- Amniotic egg
- Reptile
- Ectothermic
- Endothermic
- Mammals
- Synapsids
- Monotremes
- Marsupials
- Eutherians
- Placenta

Name _____

Chapter 1 Questions

1. What are the five unifying themes we will be examining throughout our study of biology this year?

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2. Examine the “Levels of Biological Organization” found under Figure 1.3. List the organization levels from largest to smallest AND come up with YOUR OWN examples at each level (with the exception of biosphere).

Level	Example
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

3. Give examples of form fitting function in at least one plant AND in at least one animal.

4. What characteristics do ALL cells share?

5. Explain the difference between eukaryotic and prokaryotic cells.

6. Explain the relationships among each of the following:

- Nucleotides
- Genes
- Chromosomes
- Proteins
- DNA

7. Contrast the movement of energy vs chemical elements in an ecosystem.

8. Explain examples of each of the following interactions between species:

- Mutually beneficial
- One species benefits and the other is harmed
- Both species are harmed

9. List the classification groups from smallest to largest. Finish by filling in the 3 domains of life.

S _____, G _____, F _____, O _____, C _____, P _____, K _____

Domains _____, _____, _____

10. Summarize the two main points made by Charles Darwin in *The Origin of Species*.

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11. Explain the 3 observations from nature made by Darwin from which he developed his theory of natural selection.

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12. Explain the difference between each of the following:

- Qualitative vs quantitative data
- Inductive vs deductive reasoning
- Control vs experimental groups
- Hypotheses vs theories

Name _____

Chapter 24 Questions

Overview

1. What ability of prokaryotes explains why they are the most abundant organisms on Earth?

Ch 24.1

2. It is hypothesized that chemical and physical processes could have produced simple cells through a sequence of four main stages. Identify these 4 main stages AND then explain if you agree or disagree with this hypothesis and WHY.

- 1.
- 2.
- 3.
- 4.

Agree or disagree and WHY

Ch 24.2

3. Use Figure 24.6 to explain the most common shapes of prokaryotes

- | | |
|-----------------|------------------|
| • Cocci | • Bacilli |
| • Diplococci | • Streptobacilli |
| • Streptococci | • Spirilla |
| • Staphylococci | • Spirochetes |

4. Explain why salt is used to preserve foods (in terms of salt's effect on prokaryotes).

5. Explain the medical implications of the differences in the cell wall composition of gram-positive vs gram-negative bacteria.

6. Explain the function of each of the following features of prokaryotes that enable them to thrive in a wide range of different environments.

- Cell wall
- Capsule
- Fimbriae
- Pili
- Flagella
- Circular chromosome

7. Explain how the cells of prokaryotes are simpler than those of eukaryotes in both their internal structure and the physical arrangement of their DNA.

8. Explain the difference between each of the following:

- Phototrophs
- Chemotrophs
- Autotrophs
- Heterotrophs

9. Explain the difference between each of the following:

- Obligate aerobes
- Obligate anaerobes
- Facultative anaerobes

10. Many prokaryotes can reproduce quickly in favorable environments. What three key features of prokaryotic species allow them to divide after short periods of time?

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Ch 24.3

11. Explain three factors that give rise to high levels of genetic diversity in prokaryotes, even though they reproduce asexually.

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12. Explain the difference between the following mechanisms that can bring together prokaryotic DNA from different individuals.

- Horizontal gene transfer
- Transformation
- Transduction
- Conjugation

Ch 24.4

13. Use Table 24.2 to compare and contrast the three domains of life by explaining each of the following:

- 2 similarities between bacteria and archae
- 2 differences between bacteria and archae
- 2 similarities between archae and eukarya
- 2 differences between archae and eukarya

14. Explain the important role played by methanogens in anaerobic environments such as the guts of some herbivores AND sewage treatment facilities.

Ch 24.5

15. Explain the impact of prokaryotes in each of the following areas:

- Chemical recycling
- Ecological interactions
- Impact of mutualistic bacteria on humans
- Impact of pathogenic bacteria on humans
- Research and technology

Name _____

Chapter 25 Questions

Ch 25.1

1. Explain how the structure and organization of eukaryotic cells are more complex than that of prokaryotic cells in terms of their organelles AND cytoskeleton.
2. Describe the three stages by which eukaryotic diversity arose as documented by the fossil record.
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3. Summarize at least 2 pieces of evidence that supports the endosymbiotic origin of mitochondria and plastids.
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Ch 25.2

4. The first multicellular forms were colonies. Explain what this means.

Ch 25.3

5. Why has the kingdom in which all protists were once classified, Protista, been abandoned?

6. Identify the 4 “supergroups” of eukaryotes AND *briefly describe* (NOT name!) the organisms found in each.

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7. Form fits function. Explain how the reduced mitochondria of diplomonads and parabasalids are appropriate given the environments in which those protists are found.

8. Form fits function. Explain how the structure that gives the ciliates their name allows them to be successful predators.

Ch 25.4

9. Explain how factors affecting photosynthetic protists can affect their entire community.

10. Describe at least 3 protists that are ecologically important (consider photosynthetic protists, symbiotic protists, and those that affect human health).

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Name _____

Chapter 26 Questions

Overview

1. Fossil evidence suggests plants and fungi arrived on land before animals, which depend on them to survive. In what ways do animals rely on plants and fungi for their survival?

Ch 26.1

2. Describe some of the key traits of land plants that also appear in some algae.

3. Give specific evidence that supports why researchers consider charophytes the closest living relatives of land plants.

4. Explain the benefits vs the challenges of the movement by plants to terrestrial habitats.

5. Explain 3 traits found in land plants but NOT charophyte algae.

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6. Explain the function of each of the following features that helped plants adapt to life on land.

- Sporopollenin-containing spores
- Cuticle
- Stomata

Ch 26.2

7. Although animals and fungi are both heterotrophs, explain how their feeding actions differ.

8. What adaptations facilitate and improve fungi's ability to feed by absorption?

9. Explain the importance of mycorrhizae in the colonization of land by plants and fungi.

10. Most fungi propagate themselves by producing vast numbers of spores which can be carried long distances by wind or water. Those spores can be produced sexually or asexually. Explain the difference between the two stages of sexual reproduction known as plasmogamy and karyogamy.

Ch 26.3

11. One way to distinguish plant groups is whether or not they have an extensive system of vascular tissue. Bryophytes, such as liverworts, mosses, and hornworts, lack an extensive transport system. Why are living bryophytes typically found in moist habitats?

12. Another important difference between plant groups is the dominant stage of their life cycle. Identify which generation of organisms (gametophytes or sporophytes) is dominant in each of the following plant groups:

- Mosses and other nonvascular plants
- Ferns and other seedless vascular plants
- Seed plants (gymnosperms and angiosperms)

13. How did lignified vascular tissues enable vascular plants to grow tall AND how did this height give vascular plants a competitive edge over nonvascular plants?

Ch 26.4

14. The presence of seeds and how those seeds developed also help determine the classification of various plants. What are the advantages of such adaptations as seeds and pollen grains compared to spores for life on land?

15. Why are gymnosperms better suited to drier climates than the lycophytes that previously dominated moist swamps?

16. Explain at least 3 benefits of the flowers and fruits produced by angiosperms that have helped them to become the largest group of living plants.

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Ch 26.5

17. How do lichens help pave the way for plants on cleared rock and soil surfaces?

18. How do plants affect the formation of soil AND the cycling of chemicals like carbon?

19. Explain an example of mutualistic fungi AND an example of parasitic fungi.

20. How can flower shape affect the rate at which new species form?

Name _____

Chapter 27 Questions

Overview

1. What features of animals make them highly effective eating machines?

Ch 27.1

2. How do sponges differ from nearly all other animals?
3. What do sponges have in common with choanoflagellates?

Ch 27.2

4. What is the Cambrian explosion AND what three factors are hypothesized to have spurred it?

Ch 27.3

5. Three key features of an animal's body plan are its symmetry, tissues, and body cavities. Explain how an animal's symmetry fits its lifestyle.
6. Explain the structures/organs/systems to which each of the following germ layers give rise.
 - Ectoderm
 - Endoderm
 - Mesoderm
 - Note: Mesoderm is absent in cnidarians

7. Describe 3 functions of the body cavity, or coelem.

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8. Identify AND explain the four key characteristics of chordates.

(use *Figure 27.14* to help)

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9. Fill in the blanks to help clarify chordate classification. Pay special attention to the information in bold, italics, and in *Figure 27.16* to help you. (Do NOT focus on all of the scientific names)

- Two animals that are chordates but NOT vertebrates are _____ and _____.
- Two jawless vertebrates are _____ and _____.
- Jawed vertebrates are known as _____.
- _____ and _____ are examples of chondrichthyans, which have a skeleton composed predominantly of cartilage.
- Osteichthyans, which typically have bony endoskeletons, include _____ fishes such as lionfish, bluegill, and trout.
- The three lineages of surviving lobe-fins are _____, _____, and the organisms that gave rise to the _____.

10. The success of gnathostomes probably resulted from a combination of what anatomical features and why?

Ch 27.4

11. What adaptations enabled insects and other arthropods to live on land and why?

12. Identify the 4 specialized membranes of an amniotic egg AND explain why each is important for terrestrial life. (*use Figure 27.25 to help*)

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13. Explain at least 2 different adaptations of reptiles vs mammals.

Reptiles

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Mammals

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14. Compare and contrast the three major lineages of mammals.

15. How are humans unlike other apes?

Ch 27.5

16. How did animals influence changes in ocean communities?

17. How did the colonization of land by animals affect terrestrial communities?

18. Explain 2 ways humans have altered the selective pressures faced by many species.

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